THE IMPROVING OF THE MACHINABILITY THROUGH SPLINTERING OF THE FERROUS ALLOYS

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ABSTRACT: The machinability through splintering is far from being reckoned fully known problem, it requires permanently a deepening and intensification of research in splintering domain. The knowledge of the data as better regarding of the material splintering machinability would bring implicitly at possibility anticipated assessment of the total cost of machining, by taking into account both the machining time necessary and the costs related to the construction and operation of tools, devices and machines tools in question.

KEY WORDS: machinability, splintering, heat treatment.

1.INTRODUCTION

In the technological machining processes through splintering are established different processing parameters such as: the depth of cutting, feed, speed, etc.

By increasing productivity is necessary that these parameters to be higher, but all of these depend on the quality of processed material.

To knowing how better data on machinability by splintering a material would implicitly the possibility prior evaluation of the total cost of processing, taking into account both the time required for processing and the costs of construction and operation of tools, devices and machine tools in questions.

The splintering workability is far from being considered a problem fully known, it requires constantly deepening and intensification of research in splintering domain.

2.METHODSFOR IMPROVING THE MACHINABILITY BY SPLINTERING

The steels up to 0,2% ^{0}C it shows a poor machinability of splintering because has in its composition more ferrite with low machinability property because it is slack.

The principal remediation are as follows:

- alloying material phosphorus and siliconthat leads to the brittle of ferrite.;
- alloying material with plumb, selenium, sulfur who do crumbly chip;
- applaying normalizing heat treatment which consists of heating up to 900 ° C with outdoor cooling. This treatment applies toothed parts to be threaded,etc.

For the material alloyed with chromium, nickel, molybdenum, which is to be processed by die forging and heat treatment consists of subcooling from the temperature of the end of the manufacturing process up to 500 ° C and then warming to 600-650 ^{o}C and cooling outdoor fig.1

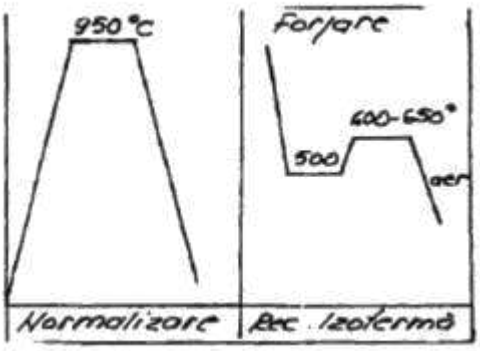

Fig.1 Normalization. Isothermal annealing

The steels with containing of C between 0,2-0,5% have a good machinability by splintering. But if it still wants to improve this property it will annealing regeneration for steel below 0.5% and normalization over 0.5%.

The steels with containing of C 0,65% 0.65% it show a structure shaped lamellas which constitutes micro-cutter and it wears splintering tool.

In order to improve processability of these materials will achieve a spheroidization annealing. It consists of warming up above transformation point AC1 up to temperature of 780-810 oC with maintaining for 4-5 hours and furnace cooling to 600 oC, cooling being made outdoors, fig. 2.

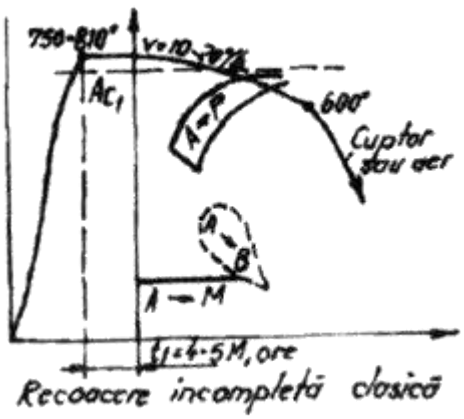

Fig.2 The incomplete classical annealing

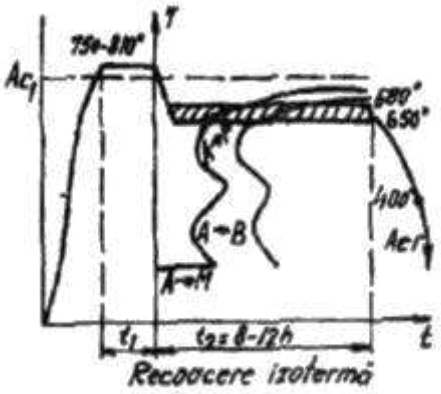

Fig.3 Isothermal annealing

The annealing steel for springs and is shown in Figure 5 is to heat the material below the AC1 subcritical because of their tendency to decarburization and formation of globular pearlite.

The globular pearlite structure has the best machinability by splintering, because the tool must not cut banded than ferrite, cementite globules are pushed aside or torn during splintering, without being cut tool as lamellar pearlite.

Globular perlite can be processed much better by cold plastic deformation, as the material flow is performed by ferrite based mass.

The lamellar pearlite structure is suitable for processing by cold plastic deformation (bending, stamping, flanging, pressing, contortion) because through deformation of banded cementite can break and fissuration products.

Spheroidization annealing should be applied to all steel before cold forming: metal sheets, bands and wires

In Figure 5 shows the influence of microstructure on the quality of machined surface through splintering

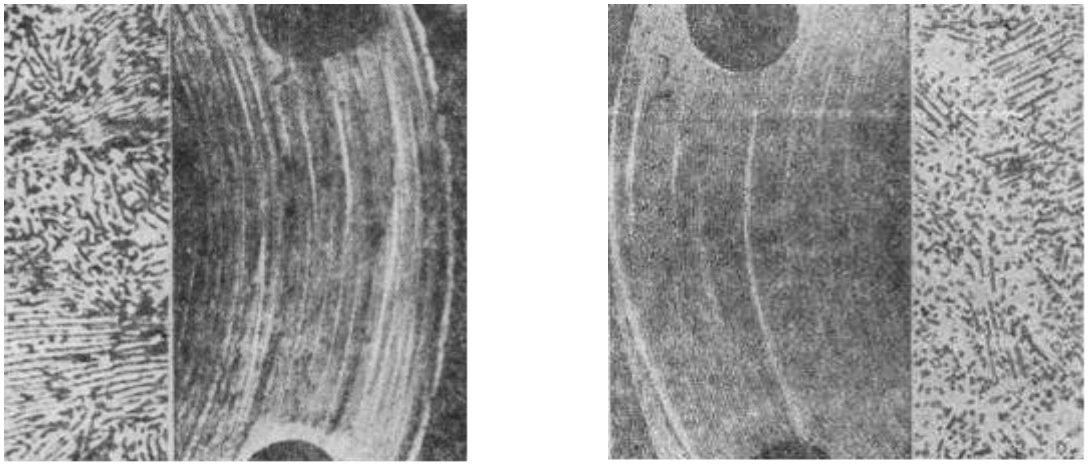

Fig.5 The influence of microstructure concerning of surface quality processed through splintering

a. lamellar perlite b. Partially spheroid zing perlite

3. CONCLUSIONS:

The splintering workability is far from being considered a problem fully known, it requires constantly deepening and intensification of research efforts in splintering domain.

The principal remediations are as follows:

- alloying material phosphorus and siliconthat leads to the embrittlement of ferrite;
- alloying material with plumb, selenium, sulfur who do crumbly chip;
- spheroidizing annealing significantly improves the characteristic of machinability through splintering steels

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